

of the eastern Gulf temperatures 1 month earlier, is minor at all seasons.

Among the corollaries of this conclusion are:

(1) Since nearly all the variation in the Straits temperatures shown in the data available can be explained in terms of normal seasonal march of temperature plus the influence of contemporary conditions in areas nearby, there is no important residual variation requiring for its explanation the operation of related conditions in far distant localities.

(2) It follows that until the future sequence of air temperatures, the future number of hours the sun will shine in the Straits area, or the future temperature of the surface waters in the eastern Gulf of Mexico can be independently predicted, the future sequence of the water-surface temperatures in the Straits of Florida must remain unpredictable.

(3) Consequently, the possibility of ever showing that Caribbean sea-surface temperature variations dominate the variations in Gulf Stream water-surface temperatures in the Straits of Florida, would seem to be approximately zero.

(4) Admittedly further study may perhaps show that important influences exist upon Straits water temperature departures from normal, besides those here shown to be significant. If they do, they are, as has been pointed out, also highly correlated with one or more of the factors already found, since the combined independent influence of any further modifying factors cannot account for a larger fraction of the Straits temperature fluctuations

about seasonal normal than is approximately shown in the last line of table 2.

Therefore, in a superficial sense at least, the numerical relationships between the causes back of the Straits temperature fluctuations are so closely given by the regression equations shown in table 1 that, from the numerical values of the four related factors here discussed, we can compute the Straits average surface temperature for any month almost as accurately as it can be found by actually averaging all the available temperature readings made during that month.

Let it be here repeated, that the temperature variation in the Caribbean Sea is not one of the four factors found in this study to be quantitatively significant in influencing Straits of Florida surface temperature variations from seasonal normal.

It appears, therefore, that predictable water-surface temperature anomalies are not transmitted by any simple, stream-like flow of water from one place to another for any great distance in the regions at the origins of the Gulf Stream. There can be little hope, therefore, of establishing the fact of such a transmission of temperature variation along any other part of the Gulf Stream or along any extratropical route other than the Gulf Stream, since it must be admitted by all that the region out of which the Gulf Stream arises is the most favorable region in which to expect comparatively undisturbed transmission of temperature-variation-cargo from torrid to temperate latitudes.

BIBLIOGRAPHY

C. FITZHUGH TALMAN, *in charge of Library*

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

Rohrbeck, Walther

Die Schätzungsgrundlagen bei Hagelschäden, von Walther Rohrbeck und Dr. Otto Schlumberger. Berlin: P. Parey, 1933. 36 p. xv pl. on 8 l. 21½ cm. "Schriftennachweis": p. 34-36.

[Smith, W. A., ed.]

A world list of scientific periodicals published in the years 1900-1933. 2d ed. London, Oxford University Press: H. Milford, 1934. xiv, 779 p. 27 cm. An alphabetical list of over 36,000 titles, giving the full title, the abbreviated title, the symbols for the libraries filing the periodical, and their holdings. Edited by W. A. Smith. Preface signed: P. Chalmers Mitchell. "Library symbols": p. xiii-xiv. "International congresses": p. 769-[780].

Vallaix, Camille

Géographie générale des mers, avec 114 figures et dessins de l'auteur en texte, 16 planches de photogravures et 4 cartes hors texte. Paris: F. Alcan, 1933. vii, 795 p. illus., plates, fold. maps, diagrs. 25 cm.

SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS DURING NOVEMBER 1934

By IRVING F. HAND, Assistant in Solar Radiation Investigations

For a description of instruments employed and their exposures, the reader is referred to the January 1932 REVIEW, page 26.

Table 1 shows that solar radiation intensities averaged above normal for November at Washington and slightly below at Madison and Lincoln.

Table 2 shows a deficiency in the amount of total solar and sky radiation received on a horizontal surface at all stations for which normals have been computed.

It is interesting to note from table 3 the rapid increase in water vapor toward noon on both November 2 and 5. On both of these days clouds formed shortly after noon. On the other hand, the 9th and 15th show in general diminished water-vapor content with approach of high sun. The 17th shows little dust and low water content of the atmosphere.

Polarization measurements obtained on 5 days at Washington give a mean of 59 percent with a maximum of 68 percent on the 15th. At Madison measurements made on 4 days give a mean of 53 percent with a maximum of 57 percent on the 6th. All these readings are below the November normals.

TABLE 1.—*Solar radiation intensities during November 1934*

[Gram-calories per minute per square centimeter of normal surface]

WASHINGTON, D. C.

Date	Sun's zenith distance										
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass								Local mean solar time	
	e	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e
Nov. 1	mm	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm	
Nov. 2	9.83	0.90	1.00	1.14	1.37	1.58	1.33	1.10		3.15	
Nov. 5	3.99	.90	1.00	1.14	1.37					2.49	
Nov. 7	7.04	.77	.90	1.09						6.50	
Nov. 7	4.57									5.16	
Nov. 9	3.30	1.01	1.12	1.26	1.39	1.33	1.18	.95	0.77	3.00	
Nov. 15	2.49	.97	1.09	1.21	1.37					2.87	
Nov. 17	3.99	.76	.89	1.01	1.24					4.75	
Means		.88	1.00	1.14	1.34	1.50	1.32	1.08	(.90)	(.94)	
Departures		+.11	+.13	+.13	+.15	+.02	+.14	+.08	+.15	+.20	

MADISON, WIS.

	3.00					1.36				2.74
Nov. 1	6.27			1.19	1.37		1.34			5.36
Nov. 5	4.75	1.00								4.75
Nov. 7	3.81	1.00	1.17	1.28						3.15
Nov. 12	3.15	.73								3.15
Nov. 13	4.95	1.00	1.12							3.81
Nov. 15	3.63	.87	.98			1.24	0.96			4.17
Nov. 16	5.16	.57	.66		1.16	1.11	.86			8.18
Nov. 24	3.63		.45							3.99
Means		.86	.88	(1.24)	(1.26)	1.26	(.91)			
Departures		-.02	-.13	+.08	-.04		-.06	-.21		

* Extrapolated.

TABLE 2.—*Average daily totals of solar radiation (direct+diffuse) received on a horizontal surface*

Week beginning—	Gram-calories per square centimeter														
	Washington	Madison	Lincoln	Chicago	New York	Fresno	Pittsburgh	Fairbanks	Twin Falls	Miami	New Orleans	River-side	Blue Hill	Mount Washington	Friday Harbor
1934															
Oct. 29	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
Nov. 5	275	194	246	175	162	315	153	41	210	346	294	295	233		81
Nov. 12	206	187	281	181	160	296	106	28	281	335	322	308	212		117
Nov. 19	232	159	182	170	133	180	142	34	208	320	285	213	232		112
Nov. 26	197	88	147	160	144	177	86	40	131	330	190	292	156		77
	97	69	70	55	65	215	101	8	176	284	160	289	117		84
Departures from weekly normals															
Oct. 29	+24	+8	+5	+29	-20	-8	-1	+3	-30	+0	+14				
Nov. 5	+21	+22	+37	+58	+12	+5	-22	-1	+77	-7	+46				
Nov. 12	+33	+21	-29	+67	-6	-79	+21	+9	+33	-28	+26				
Nov. 19	+9	-39	-60	+45	+23	-59	-35	-19	-26	+6	-38				
Nov. 26	-70	-56	-117	-31	-42	+2	-5	-6	+36	-14	-54				
Accumulated departures on Dec. 2															
	+2,198	-3,262	+6,071	-----	+13,379	+8,491	+603	+455	+5,845	-7,763	+6,224	-----	-----	-----	-----

TABLE 3.—Total, I_m , and screened, I_y , I_r , solar radiation intensity measurements, obtained during November 1934, and determinations of the atmospheric turbidity factor, β , and water-vapor content, w —depth in millimeters, if precipitated

AMERICAN UNIVERSITY, WASHINGTON, D. C.

Date and hour angle	Solar altitude	Air mass	I_m	I_y	I_r	β_{I_m-r}	β_{I_y-r}	β_{mean}	$\frac{I_{w=0}}{1.94}$	$\frac{I_{w=0}-I_m}{1.94}$	w	Air-mass type
									percentage of solar constant			
<i>Nov. 2, 1934</i>												
3:52 a. m.	13 53	4.12	1.010	0.792	0.661	0.044	0.046	0.045	59.8	8.4	1.7	P _c
3:47 a. m.	14 41	3.89	1.024	.794	.661	.042	.046	.044	61.2	9.2	2.7	
3:52 a. m.	17 03	3.38	1.090	.853	.646	.025	.018	.022	71.5	16.2	47.8	
3:26 a. m.	17 58	3.22	1.120	.855	.646	.020	.020	.020	73.8	16.9	52.5	
<i>Nov. 5, 1934</i>												
3:52 a. m.	13 14	4.30	.857	.704	.586	.072	.060	.066	55.0	11.6	6.9	N _{PP}
3:48 a. m.	13 53	4.12	.876	.766	.588	.070	.072	.066	54.8	10.4	4.7	
3:36 a. m.	15 47	3.64	.926	.724	.605	.068	.068	.068	58.6	9.7	3.6	
3:32 a. m.	16 24	3.51	.952	.726	.608	.065	.075	.070	56.8	8.6	2.3	
3:28 a. m.	17 02	3.39	.966	.746	.611	.052	.060	.056	61.2	12.3	11.5	
2:46 a. m.	23 01	2.55	1.063	.750	.647	.042	.070	.056	65.2	11.3	10.3	
2:42 a. m.	23 45	2.48	1.092	.809	.647	.034	.054	.044	71.4	16.0	60.0	
<i>Nov. 9, 1934</i>												
3:46 a. m.	13 16	4.30	1.098	.869	.694	.022	.010	.016	60.8	14.2	17.5	P _c
3:41 a. m.	14 02	4.08	1.125	.872	.697	.020	.014	.017	60.4	12.4	9.9	
3:33 a. m.	15 16	3.76	1.182	.872	.716	.018	.028	.023	68.6	9.7	3.5	
3:30 a. m.	15 48	3.64	1.180	.876	.719	.020	.028	.023	70.0	10.2	4.3	
3:13 a. m.	18 16	3.17	1.232	.940	.757	.020	.020	.020	74.0	11.6	9.3	
3:09 a. m.	18 52	3.07	1.277	.943	.759	.018	.018	.018	74.0	9.3	3.6	
3:01 a. m.	20 00	2.90	1.262	.952	.778	.028	.028	.028	71.8	6.8	1.3	
2:57 a. m.	20 33	2.83	1.298	.955	.780	.022	.026	.024	71.8	6.0	.9	
2:31 a. m.	24 00	2.45	1.313	.963	.787	.028	.038	.033	75.0	8.4	3.0	
2:27 a. m.	24 33	2.40	1.329	.965	.790	.028	.042	.035	75.0	7.6	2.2	
1:44 a. m.	29 14	2.04	1.410	.985	.790	.018	.032	.025	79.3	7.8	2.8	
1:41 a. m.	29 28	2.02	1.383	.989	.790	.020	.032	.026	79.2	9.0	4.7	
0:25 a. m.	33 59	1.79	1.430	1.008	.805	.021	.033	.027	80.4	7.8	3.1	
0:20 a. m.	34 05	1.78	1.451	1.010	.805	.018	.032	.025	81.2	7.5	2.8	
<i>Nov. 15, 1934</i>												
3:36 a. m.	13 36	4.20	1.048	.846	.678	.044	.018	.031	64.6	11.6	7.0	P _c
3:32 a. m.	14 14	4.02	1.089	.846	.679	.022	.022	.022	68.2	13.1	12.7	
2:59 a. m.	19 02	3.05	1.188	.928	.729	.032	.010	.026	71.8	11.7	10.1	
2:55 a. m.	19 32	2.98	1.218	.930	.732	.024	.010	.017	76.4	14.8	35.1	
2:18 a. m.	24 10	2.43	1.330	.987	.783	.022	.034	.028	74.8	7.4	2.0	
2:14 a. m.	24 42	2.38	1.333	.970	.785	.023	.036	.030	75.0	7.4	2.0	
1:17 a. m.	29 57	2.00	1.367	.991	.801	.032	.040	.036	76.8	7.5	2.5	
1:02 a. m.	30 52	1.95	1.389	1.005	.802	.028	.024	.026	78.5	9.0	4.9	
0:58 a. m.	31 08	1.93	1.392	1.010	.800	.028	.022	.025	79.6	9.0	4.9	
0:15 a. m.	32 34	1.86	1.392	.984	.777	.020	.024	.022	81.6	11.0	12.4	
0:11 a. m.	32 37	1.85	1.408	.984	.777	.018	.024	.021	81.6	10.2	8.5	
<i>Nov. 17, 1934</i>												
3:41 a. m.	13 11	4.32	.836	.683	.581	.078	.070	.074	50.6	8.3	1.6	N _{sc}
3:37 a. m.	13 48	4.14	.852	.683	.581	.076	.076	.076	51.2	8.1	1.5	

Atmospheric conditions during turbidity measurements

Nov. 2: Temperature, 2° C.; wind, NW. 12; visibility, 20 miles; polarization, 50 percent; blueness of sky, 4.

Nov. 5: Temperature, 7° C.; wind, NW. 16; visibility, 20 miles; polarization, 64 percent; blueness of sky, 5.

Nov. 9: Temperature, 2° C.; wind, N. 15; visibility, 50 miles; polarization, 66 percent; blueness of sky, 6.

Nov. 15: Temperature, -2° C.; wind, NW. 10; visibility, 30 miles; polarization, 68 percent; blueness of sky, 6.

Nov. 17: Temperature, 0° C.; wind, S. 8; visibility, 12 miles; polarization, 47 percent; blueness of sky, 4.

TABLE 3.—Total, I_m , and screened, I_y , I_r , solar radiation intensity measurements, obtained during November 1934, and determinations of the atmospheric turbidity factor, β , and water-vapor content, w =depth in millimeters, if precipitated—Continued

BLUE HILL METEOROLOGICAL OBSERVATORY OF HARVARD UNIVERSITY

Date and hour angle	Solar altitude	Air mass	I_m	I_y	I_r	β_{I_m-r}	β_{I_y-r}	β_{mean}	$\frac{I_{w=0}}{I_m}$	$\frac{I_{w=0}-I_m}{I_m}$	w	Air-mass type	
									percentage of solar constant				
<i>Nov. 2, 1934</i>													
2:24 a. m.	24° 10'	m	gr. cal.	gr. cal.	gr. cal.	0.026	0.037	0.032	80.7	11.1	mm	P _c	
2:11 a. m.	25° 36'	2.43	1.373	1.004	.820	.026	.021	.024	77.7	7.5	10.1	P _c	
0:43 p. m.	32° 11'	2.31	1.382	1.018	.820	.036	.054	.045	77.4	7.0	2.1	P _c	
1:59 p. m.	27° 12'	1.87	1.388	.988	.803	.048	.049	.048	72.7	7.7	2.2	P _c	
		2.18	1.282	.945	.766						2.5		
<i>Nov. 3, 1934</i>													
0:59 a. m.	31° 11'	1.93	1.240	.903	.724	.060	.075	.068	72.3	9.4	6.1	N _{re} and P _c	
0:30 p. m.	32° 22'	1.87	1.223	.891	.716	.069	.078	.071	71.2	9.2	5.5	P _c and N _{re}	
<i>Nov. 5, 1934</i>													
2:24 a. m.	23° 21'	2.52	1.166	.850	.694	.047	.065	.056	68.0	8.9	3.8	N _{re}	
1:11 a. m.	29° 55'	2.00	1.205	.881	.703	.060	.056	.058	72.4	11.3	11.3	T _a aloft	
0:37 p. m.	31° 33'	1.91	1.191	.864	.679	.060	.050	.055	72.0	11.6	16.0		
<i>Nov. 7, 1934</i>													
3:21 a. m.	15° 30'	3.70	1.210	.894	.744	.018	.038	.028	67.9	6.7	1.1	N _{re}	
<i>Nov. 8, 1934</i>													
3:39 a. m.	12° 39'	4.50	1.067	.820	.679	.052	.036	.044	68.3	14.3	19.5	P _r	
1:55 p. m.	25° 34'	2.31	1.176	.875	.713	.049	.059	.054	70.3	10.8	9.3		
<i>Nov. 9, 1934</i>													
1:02 a. m.	29° 17'	2.04	1.388	1.016	.820	.037	.032	.034	77.3	7.1	2.0	P _c	
0:19 p. m.	30° 49'	1.95	1.344	.984	.787	.043	.033	.038	76.8	8.7	4.2		
<i>Nov. 12, 1934</i>													
0:17 a. m.	30° 00'	2.00	1.253	.928	.749	.049	.058	.054	73.2	8.4	3.7	P _c	
<i>Nov. 13, 1934</i>													
1:35 a. m.	25° 59'	2.28	1.266	.906	.755	.046	.072	.059	69.5	5.6	.9	P _c , N _{re} aloft	
<i>Nov. 14, 1934</i>													
3:24 a. m.	12° 41'	4.47	1.003	.772	.659	.043	.073	.058	54.8	4.1	.2	P _c	
1:59 a. m.	23° 44'	2.48	1.220	.920	.740	.050	.038	.044	71.2	9.7	5.2		
0:52 a. m.	28° 25'	2.10	1.305	.982	.795	.045	.045	.045	74.2	6.4	1.5		
0:08 p. m.	29° 35'	2.02	1.337	.996	.809	.041	.046	.044	75.3	7.4	2.3	P _c	
<i>Nov. 15, 1934</i>													
1:38 a. m.	25° 30'	2.32	1.329	.973	.779	.030	.037	.034	75.1	8.1	2.8	N _{re}	
0:34 p. m.	28° 50'	2.07	1.288	.930	.756	.047	.063	.055	72.2	7.3	2.2	P _c	
1:58 p. m.	23° 31'	2.50	1.044	.777	.655	.087	.125	.106	59.2	6.6	1.4		
<i>Nov. 17, 1934</i>													
3:24 a. m.	12° 52'	4.51	.853	.671	.565	.052	.067	.060	54.1	11.2	5.4	P _{re}	
2:07 a. m.	22° 11'	2.63	.987	.742	.596	.075	.073	.074	63.2	13.5	22.8		
0:03 a. m.	28° 50'	2.07	1.029	.791	.626	.112	.071	.092	65.1	13.3	27.1		
1:58 p. m.	23° 03'	2.55	1.014	.760	.013	.075	.152	.114	66.3	15.2	53.6	N _{re}	
<i>Nov. 25, 1934</i>													
3:20 a. m.	11° 59'	4.72	1.106	.836	.692	.017	.025	.021	65.8	10.3	14.0	P _c	
1:13 a. m.	24° 47'	2.37	1.257	.935	.753	.047	.043	.045	71.9	8.8	3.8		
0:01 a. m.	27° 04'	2.19	1.260	.921	.743	.048	.051	.050	72.1	8.9	4.3		

Atmospheric conditions during solar radiation measurements, Blue Hill Meteorological Observatory of Harvard University

POSITIONS AND AREAS OF SUN SPOTS

NOTE.—Owing to delay in receiving the reports for November, the data for that month will be published in the December REVIEW.—Editor.

PROVISIONAL SUN-SPOT RELATIVE NUMBERS FOR NOVEMBER 1934

(Dependent alone on observations at Zurich and its station at Arosa)

[Data furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich, Switzerland]

November 1934	Relative numbers	November 1934	Relative numbers	November 1934	Relative numbers
1	13	11	7	21	0
2	14	12	7	22	0
3	16	13	0	23	0
4	14	14	0	24	0
5	12	15	0	25	7
6	16	0	26	M _e	11
7	10	17	0	27	14
8	8	18	7	28	23
9	10	19	29	W _e	36
10	7	20	0	30	32

Mean, 28 days = 8.9.

c=New formation of a center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central circle zone.

14: 33 a. m.	-1.7	NNW 4	7	6-7	Few Cu, Stcu.
14: 08 a. m.	-2.2	NW 3	9	7	1 Stcu, Cu, few Frcu, smoke NE
14: 01 p. m.	-1.7	NW 4	9+	7	1 Stcu in E, few Cu, Frcu, in S, W.
14: 217 p. m.	-1.2	NW 4	9+	7	1 Cicu.
15: 345 a. m.	-6.4	W 2	9	7	Mod. haze.
15: 025 p. m.	+1.2	W 2	8+9	7	2 Ci, 1 Acu, lt. haze.
15: 153 p. m.	3.2	WSW 3	8+9	6	Few Ci, 3 Acu.
17: 215 a. m.	5.6	SW x W 4	7+	6	Few Ci.
17: 08 a. m.	11.2	WSW 5	7+	6	Dense haze.
17: 149 p. m.	14.4	WSW 4	7+	6	Dense, mod-dense haze.
17: 341 p. m.	13.8	SW W 4	8-	5	1 Ci, dense haze.
22: 23 p. m.	12.7	S 4	9	8	4 Cu.
24: 328 p. m.	6.6	NW 4	9	5	6 Ci, 2 Acu, clouds 5° from sun.
25: 328 a. m.	-2.7	NNW 5	8	9	Few Acu.
25: 1:17 a. m.	-0.4	N 5	8-9	8	Stcu to E.
25: 0:02 a. m.	+1.1	N 3	8	9	Few Cu.
25: 3:26 p. m.	2.2	N 3	9	9	Few Cu.